

# **Navajo Abandoned Uranium Mine**

## **Site Screen Report**

*This form is for use at the site of abandoned uranium mines (AUM) located on Navajo Nation lands. Applicable sites include all mine and mine features that have or have not undergone reclamation by the Navajo Abandoned Mine Lands Reclamation Program, including features, adits, pits and waste piles. Applicable sites also include all AUM sites listed in the USEPA CERCLIS database, all sites listed in the 2008 AUM GIS Report issued by USACOE and USEPA, all AUM sites on allotment lands associated with the Navajo Nation, and any and all AUM sites not listed in any database located on Navajo lands. Reconnaissance of any sites located on lands adjacent to Navajo lands that may be impacting Navajo lands will need to be coordinated with the authorities appropriate to those lands.*

*The purpose of the form is to ascertain the status and location of the identified AUM site, and record all immediate site information associated with the mine site. Decisions and recommendations on what additional steps are needed will be provided on a separate document.*

### **Enos Johnson AUM Site**

#### **Navajo AUM Northern Region**

**Prepared by:**

**Weston Solutions, Inc.**

**Contract: W91238-06-F-0083**

**12767.063.496.1111**

**March 2010**

**Part I Site Identification, Location and Status****Site Names and ID numbers as applicable****Mine ID:** 413, 465, 466, 614**Map ID:** #413 – N281  
#465 – N274  
#466 – N275  
#614 – N280**CERCLIS:** NNN000908881**Navajo Abandoned Mine Land Reclamation Program:**#413 – None  
#465 – NA-0611  
#466 – NA-0604  
#614 – None**Local name / Aliases:** None**Chapter and local area:** #413 – Sanostee Chapter  
#465 – Sanostee Chapter  
#466 – Sanostee Chapter  
#614 – Sanostee Chapter**County:** San Juan **State:** New Mexico**Lat/Long:** #413 - 36.4142316290 N / -108.993166535 W  
#465 - 36.4181071854 N / -109.001062011 W  
#466 - 36.4192208466 N / -108.998704802 W  
#614 - 36.4130772138 N / -108.996725602 W**Nearby road and highway:** IR 5010 **Local Post Office:** Sanostee**Surface Land Status: check one or more and provide ownership and contact information below**

<b>Tribal Trust Land</b>	<input checked="" type="checkbox"/>	<b>Public lands</b>	<input type="checkbox"/>
<b>Private</b>	<input type="checkbox"/>	<b>Tribal Fee Land</b>	<input type="checkbox"/>
<b>Bureau of Land Mgmt</b>	<input type="checkbox"/>	<b>Allotment</b>	<input type="checkbox"/>
<b>State</b>	<input type="checkbox"/>	<b>Fee land</b>	<input type="checkbox"/>

**Subsurface Mineral Rights:**

The mineral rights ownership was identified as Indian.

**Claim and operator information:**

The mine site surface land status is classified as Tribal Trust Land. Historical documents showed the operator of the mine as Enos Johnson in 1952, and R.D. Young from 1952 to 1954. No other historical ownership / lease information was identified in the EPA/AUM database.

**Number of residential structures within 200 feet of mine:** None

**Estimated volume of mine waste onsite:** #413 – None  
#465 – 40 yd<sup>3</sup>  
#466 – 4,630 yd<sup>3</sup>  
#614 – None

## Part II Summary of radiological readings

### Mine ID # 413

#### Highest gamma radiation measurement:

313,866 counts per minute (cpm)

#### Describe any other radiological measurements:

A total of 2,878 gamma radiation measurements were collected from the mine site, ranging from 7,668 cpm to 313,866 cpm. The measurements are represented in Figures 2 and 3.

#### Background Locations

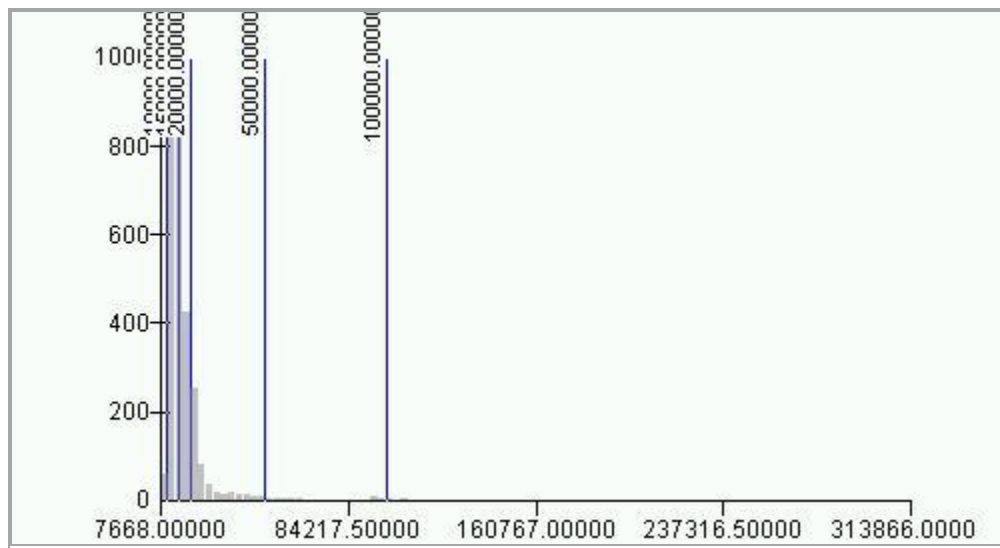
#1 11,465 cpm

#2 14,605 cpm

**Average background = 13,037 cpm**

#### Distribution Chart and Statistics:

The following chart and statistics were generated by ESRI ArcGIS 9.3.1, and show the general distribution of the site gamma radiation measurements. The horizontal X axis represents the gamma radiation reading levels in cpm (lowest levels to the left). The vertical Y axis represents the frequency of each gamma radiation level.



Count:	2878
Minimum:	7668.00000
Maximum:	313866.00000
Sum:	53883985.00000
Mean:	18722.71890
Median:	15403.00000
Standard Deviation:	18147.35158

**Mine ID # 465****Highest gamma radiation measurement:**

201,218 counts per minute (cpm)

**Describe any other radiological measurements:**

A total of 1,383 gamma radiation measurements were collected from the mine site, ranging from 11,465 cpm to 201,218 cpm. Measurements in the vicinity of the waste debris with exposed green boulders, near the rim strip were found at levels ranging from 50,000 - 150,000 cpm. The measurements are represented in Figures 4 and 5.

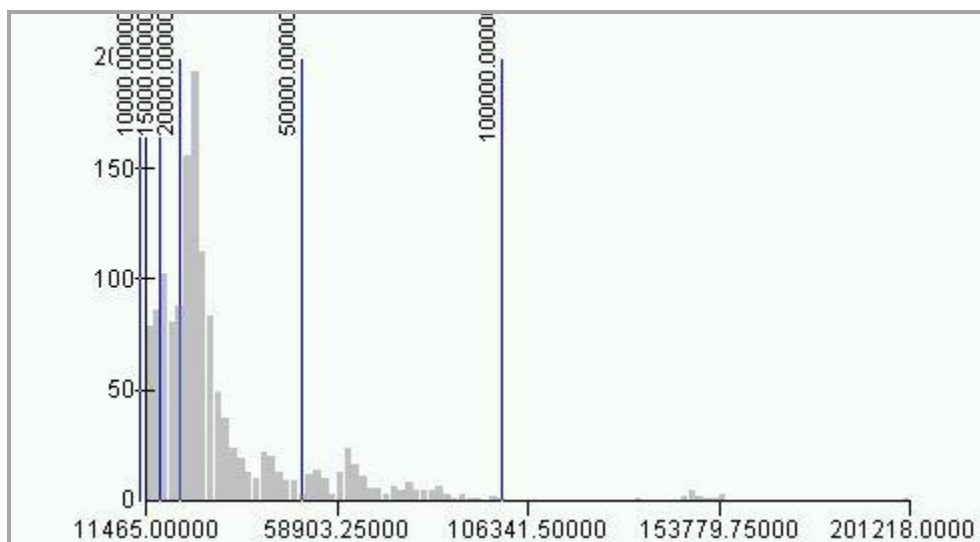
**Background Locations**

#1 22,989 cpm

**Average background = 22,989 cpm**

**Distribution Chart and Statistics:**

The following chart and statistics were generated by ESRI ArcGIS 9.3.1, and show the general distribution of the site gamma radiation measurements. The horizontal X axis represents the gamma radiation reading levels in cpm (lowest levels to the left). The vertical Y axis represents the frequency of each gamma radiation level.



Count:	1383
Minimum:	11465.00000
Maximum:	201218.00000
Sum:	41692491.00000
Mean:	30146.41432
Median:	23684.00000
Standard Deviation:	20630.36538

**Mine ID # 466****Highest gamma radiation measurement:**

157,754 counts per minute (cpm)

**Describe any other radiological measurements:**

A total of 2,120 gamma radiation measurements were collected from the mine site, ranging from 10,617 cpm to 157,754 cpm. Measurements in the vicinity of the waste debris slope were found at levels above 100,000 cpm. The measurements are represented in Figures 6 and 7.

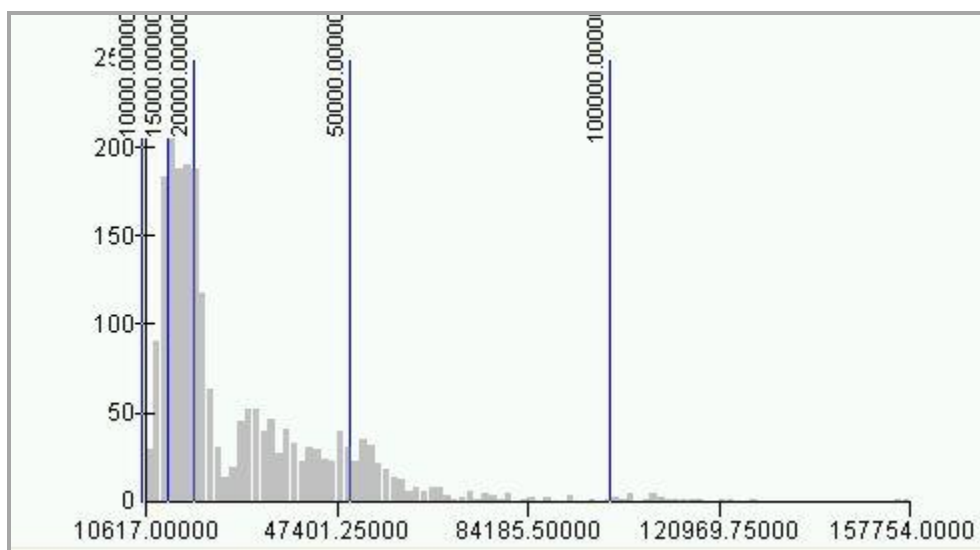
**Background Locations**

#1 12,900 cpm

**Average background = 12,900 cpm**

**Distribution Chart and Statistics:**

The following chart and statistics were generated by ESRI ArcGIS 9.3.1, and show the general distribution of the site gamma radiation measurements. The horizontal X axis represents the gamma radiation reading levels in cpm (lowest levels to the left). The vertical Y axis represents the frequency of each gamma radiation level.



Count:	2120
Minimum:	10617.00000
Maximum:	157754.00000
Sum:	60318896.00000
Mean:	28452.30943
Median:	20594.50000
Standard Deviation:	17673.07343

**Mine ID # 614****Highest gamma radiation measurement:**

33,538 counts per minute (cpm)

**Describe any other radiological measurements:**

A total of 2,267 gamma radiation measurements were collected from the mine site, ranging from 10,920 cpm to 33,538 cpm. The measurements are represented in Figures 8 and 9.

**Background Locations**

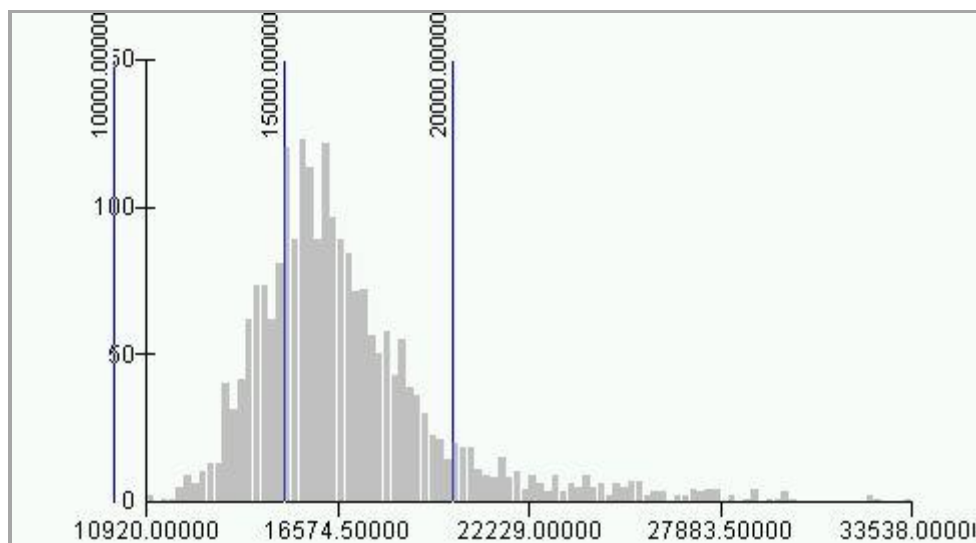
#1 11,469 cpm

#2 15,034 cpm

**Average background = 13,251 cpm**

**Distribution Chart and Statistics:**

The following chart and statistics were generated by ESRI ArcGIS 9.3.1, and show the general distribution of the site gamma radiation measurements. The horizontal X axis represents the gamma radiation reading levels in cpm (lowest levels to the left). The vertical Y axis represents the frequency of each gamma radiation level.



Count:	2267
Minimum:	10920.00000
Maximum:	33538.00000
Sum:	38248027.00000
Mean:	16871.64843
Median:	16269.00000
Standard Deviation:	2892.37215

### **Part III      Status of Reclamation and Mine Waste**

#### **Mine ID #413**

**The following information was obtained from the Navajo Abandoned Mine Land Reclamation Program (NAMLRP) Point Features Database:**

**NAMLRP Status of the mine site: Reclaimed : Yes      Waste Pile onsite : Yes**

**NAMLRP Project Number: None**

**NAMLRP Mine features: 1 Portal**

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**The following information was obtained from field observations collected during the 2009 site screening:**

**Provide description and status of all mine sites and features at site. Include all waste piles, adits, pits and other features, and indicate whether they are open, closed, covered, capped, buried or unreclaimed. Indicate approximate size, shape and extent, including description of any reclamation caps. Note condition of all caps.**

#### **Observed reclamation work and status:**

##### **Adits**

None

##### **Waste Piles**

None

##### **Pits**

None

##### **Shafts**

None

##### **Other Debris and Mine Features**

None



**Mine ID #465**

**The following information was obtained from the Navajo Abandoned Mine Land Reclamation Program (NAMLRP) Point Features Database:**

**NAMLRP Status of the mine site: Reclaimed : Yes      Waste Pile onsite : No**

**NAMLRP Project Number: NA-0611**

**NAMLRP Mine features: 1 Rim Strip / Pit**

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**The following information was obtained from field observations collected during the 2009 site screening:**

**Provide description and status of all mine sites and features at site. Include all waste piles, adits, pits and other features, and indicate whether they are open, closed, covered, capped, buried or unreclaimed. Indicate approximate size, shape and extent, including description of any reclamation caps. Note condition of all caps.**

**Observed reclamation work and status:**

**Adits**

None

**Waste Piles**

None

**Pits**

None

**Shafts**

None

**Other Debris and Mine Features**

Some slough off from existing rim strip operation leading into site with exposed green boulders; reclamation cap found in the center of the site

**Mine ID #466**

**The following information was obtained from the Navajo Abandoned Mine Land Reclamation Program (NAMLRP) Point Features Database:**

**NAMLRP Status of the mine site: Reclaimed : Yes      Waste Pile onsite : Yes**

**NAMLRP Project Number: NA-0604**

**NAMLRP Mine features: 1 Portal**

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**The following information was obtained from field observations collected during the 2009 site screening:**

**Provide description and status of all mine sites and features at site. Include all waste piles, adits, pits and other features, and indicate whether they are open, closed, covered, capped, buried or unreclaimed. Indicate approximate size, shape and extent, including description of any reclamation caps. Note condition of all caps.**

**Observed reclamation work and status:**

**Adits**

None

**Waste Piles**

Debris slope with salt wash member, 100' x 250', with a total estimated volume of 4,630 yd<sup>3</sup>

**Pits**

None

**Shafts**

None

**Other Debris and Mine Features**

None

**Mine ID #614**

**The following information was obtained from the Navajo Abandoned Mine Land Reclamation Program (NAMLRP) Point Features Database:**

**Not found in NAMLRP Database**

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**The following information was obtained from field observations collected during the 2009 site screening:**

**Provide description and status of all mine sites and features at site. Include all waste piles, adits, pits and other features, and indicate whether they are open, closed, covered, capped, buried or unreclaimed. Indicate approximate size, shape and extent, including description of any reclamation caps. Note condition of all caps.**

**Observed reclamation work and status:**

**Adits**

None

**Waste Piles**

None

**Pits**

None

**Shafts**

None

**Other Debris and Mine Features**

None

## Part IV

### Site observations and Environs

**Observed Structures: list number of and describe human habitation status of structures at the following distances from mine:**

**0 to 200 feet:** None

**200 feet to 0.25 mile:** None

**Observed Public or commercial structure: list and describe all schools, clinics, Chapter Houses, places of business and any other structure used by members of the community at the following distances:**

**0 to 200 feet:** None

**200 feet to 0.25 mile:** None

**Levels measured around the perimeter(s) of the identified structure(s):** None

**Observed water sources: list the number and type of wells and surface water sources that are potentially used for human consumption at the following distances from the mine:**

**0 to 0.25 miles:** None

**0.25 miles to 4 miles:** None

**Sensitive environments: note and describe all sensitive environments located within visible range of the mine site, including: wetlands, endangered species, habitats and approximate locations of sites that may be under protection of the government of the Navajo Nation.**

None observed

**Known Site History: include information from interviews with Chapter officials and residents. Note information on mine ownership, type of mining operation, period of operation, known amount of production, and any other information as provided.**

Enos Johnson mine consists of 4 mine sites with a total area of 88,595.28 m<sup>2</sup> (#413 – 18,607.07 m<sup>2</sup>, #465 – 11,033.93 m<sup>2</sup>, #466 – 36,889.46 m<sup>2</sup>, #614 – 22,064.82 m<sup>2</sup>). The mine was identified as being operational from 1952 to 1954. Historical documents showed the operator of the mine as Enos Johnson in 1952, and R.D. Young from 1952 to 1954. While operational, the mine had a total reported production volume of 1,544 tons. No other historical information or any additional ownership / lease information was identified in the EPA/AUM database.

## **Part V            Response Action Summary**

**Site Name(s):** Enos Johnson            **Chapter:** Sanostee.

### **Decision Criteria**

**Is there an unreclaimed waste pile at the site?** Yes

**At what distance from the waste pile is the nearest residential structure located?** None

**At what distances from the waste pile are there potential drinking water sources?** None

**Is there a reclamation cap or sealed adit in place at the site?** Yes

**Is the cap/seal functionally intact?** Yes

**Is the cap/seal sufficiently degraded to create a concern about releases?** No

**At what distance from the cap/seal is the nearest domestic structure located?** None

**At what distance from the cap/seal is the nearest domestic drinking water source?** None

### **Summary of emergency response factors**

None

### **Summary hazard ranking system factors**

None

### **Summary of reclamation factors**

Waste debris found at sites #465 and #466; reclamation cap at site #465

## Part VI      Photos



Photo 1. Mine site #413



Photo 2. Mine site #413





Photo 3. Mine site #413



Photo 4. Mine site #465 exposed green rock with elevated readings





Photo 5. Mine site #465 reclamation cap



Photo 6. Mine site #465





Photo 7. Mine site #466 waste debris



Photo 8. Mine site #466 waste debris



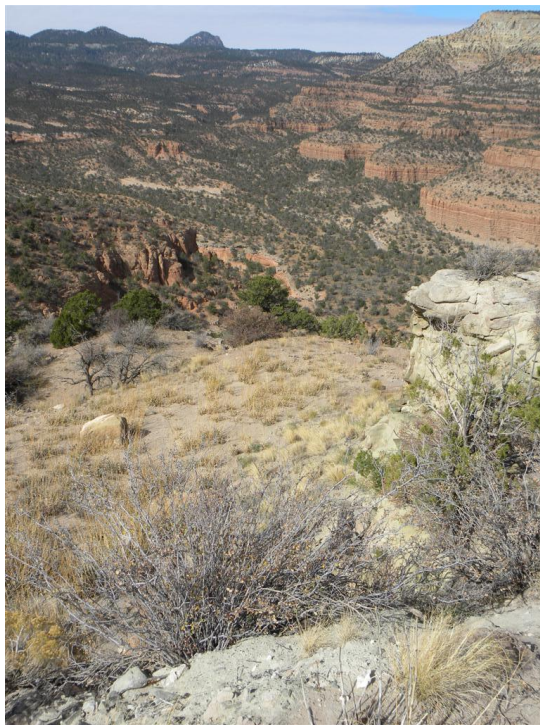


Photo 9. Mine site #466

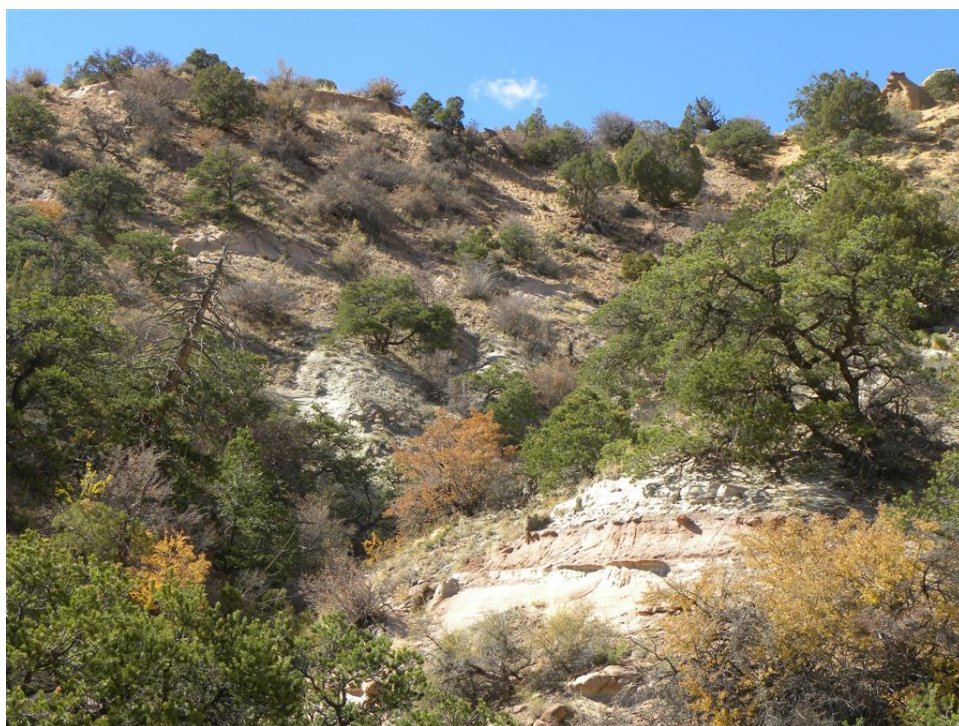


Photo 10. Mine site #614





Photo 11. Mine site #614



Photo 12. Mine site #614

**Part VII      Contacts Reports and Information**Name: Stanley Edison (928) 871-6861Eugene Esplain (928) 871-7331Title or official role (if any) Navajo EPA Superfund ProgramAddress PO Box 2946, Window Rock, AZ 86515Information provided Lead Regulatory Agency

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Name \_\_\_\_\_

Title or official role (if any) \_\_\_\_\_

Address \_\_\_\_\_

Telephone number \_\_\_\_\_

Information provided \_\_\_\_\_

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Name \_\_\_\_\_

Title or official role (if any) \_\_\_\_\_

Telephone number \_\_\_\_\_

Information provided \_\_\_\_\_

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Name \_\_\_\_\_

Title or official role (if any) \_\_\_\_\_

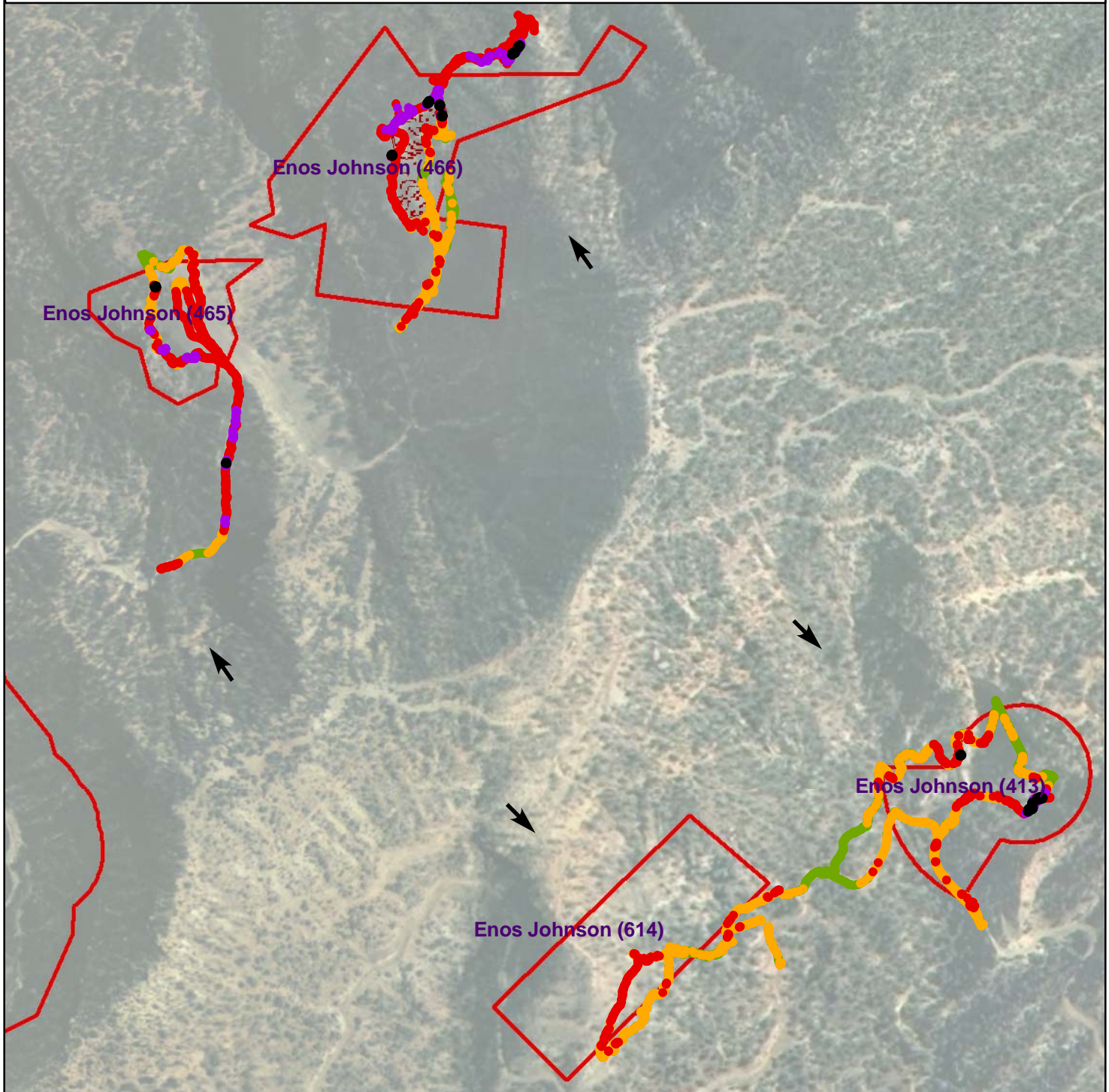
Telephone number \_\_\_\_\_

Information provided \_\_\_\_\_

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**Figure 1 - Gamma Radiation Measurements**  
**Enos Johnson (413, 465, 614)**  
**Navajo Nation, Arizona**



## Legend

### Gamma Radiation Measurements

- 0 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 50,000
- 50,000 - 100,000
- > 100,000

➔ General Direction Down-Slope

▭ Mine Claim Boundaries

Gamma survey conducted 10/2009  
 Measured as counts per minute (cpm)

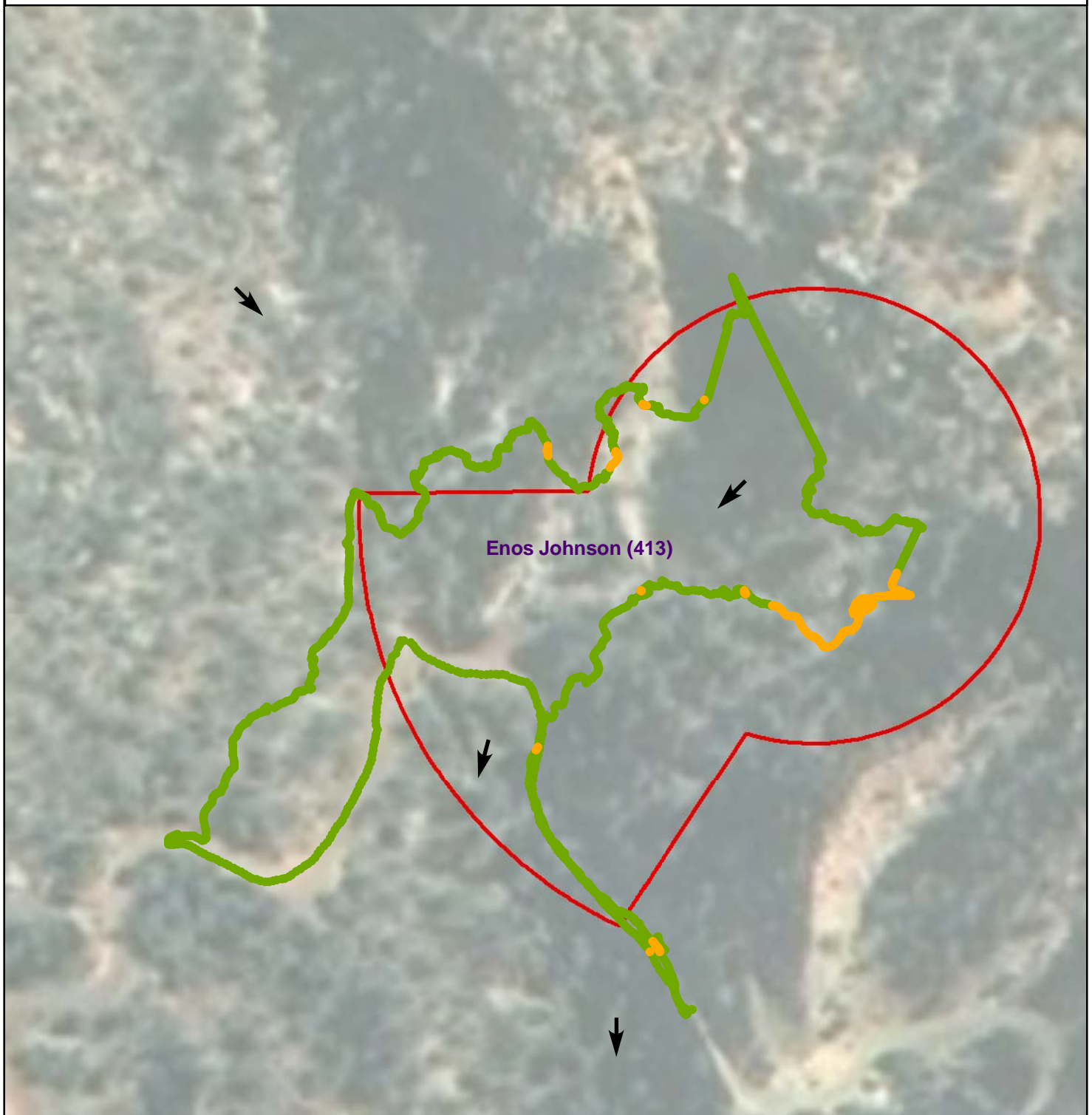


0 500 Feet



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**Figure 2 - Gamma Radiation Measurements, Above Two Times Background  
Enos Johnson (413)  
Sanostee Chapter, Navajo Nation, Arizona**



### Legend

#### Gamma Radiation Measurements

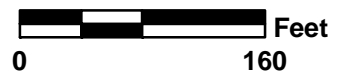
- < 2X Background
- > 2X Background

Gamma survey conducted 10/2009  
Measured as counts per minute (cpm)

Average background = 13,037 cpm

➔ General Direction Down-Slope

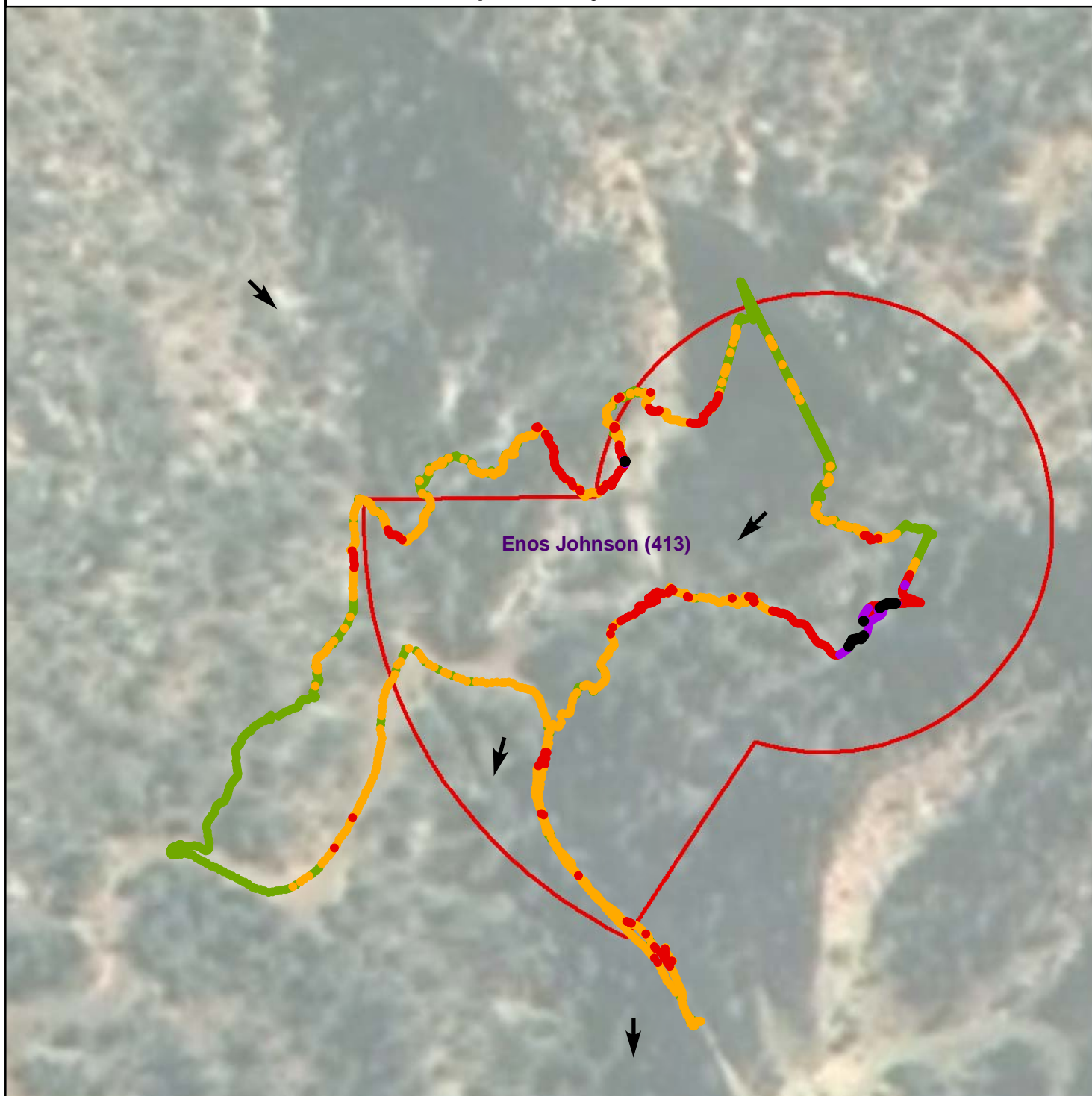
▭ Mine Claim Boundaries



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**Figure 3 - Gamma Radiation Measurements**  
**Enos Johnson (413)**  
**Sanostee Chapter, Navajo Nation, Arizona**



## Legend

### Gamma Radiation Measurements

- 0 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 50,000
- 50,000 - 100,000
- > 100,000

➔ General Direction Down-Slope

▭ Mine Claim Boundaries

Gamma survey conducted 10/2009  
 Measured as counts per minute (cpm)

Average background = 13,037 cpm

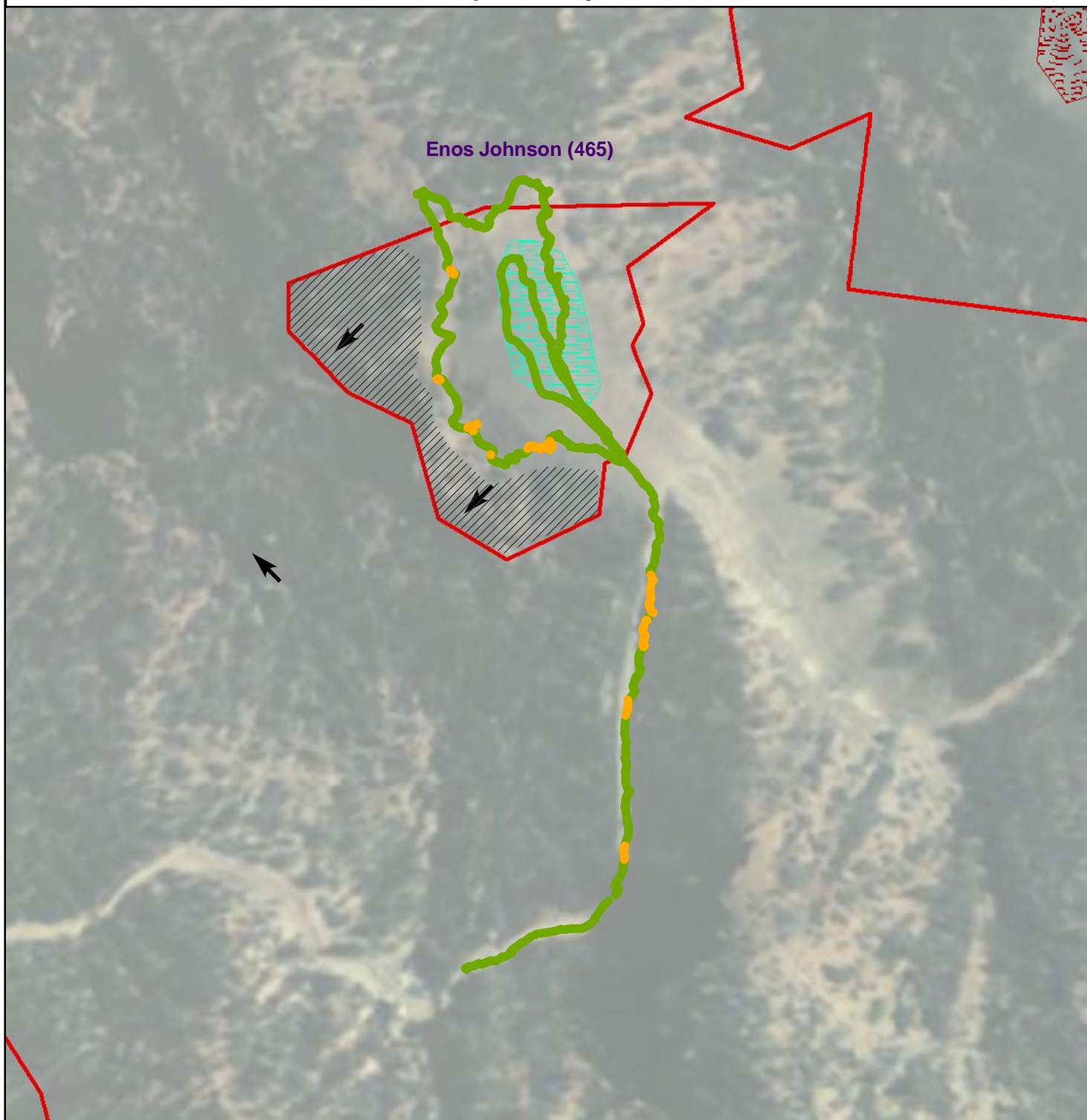


0 150 Feet



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**Figure 4 - Gamma Radiation Measurements, Above Two Times Background  
Enos Johnson (465)  
Sanostee Chapter, Navajo Nation, Arizona**







### Legend

#### Gamma Radiation Measurements

- < 2X Background
- > 2X Background

Gamma survey conducted 10/2009  
Measured as counts per minute (cpm)

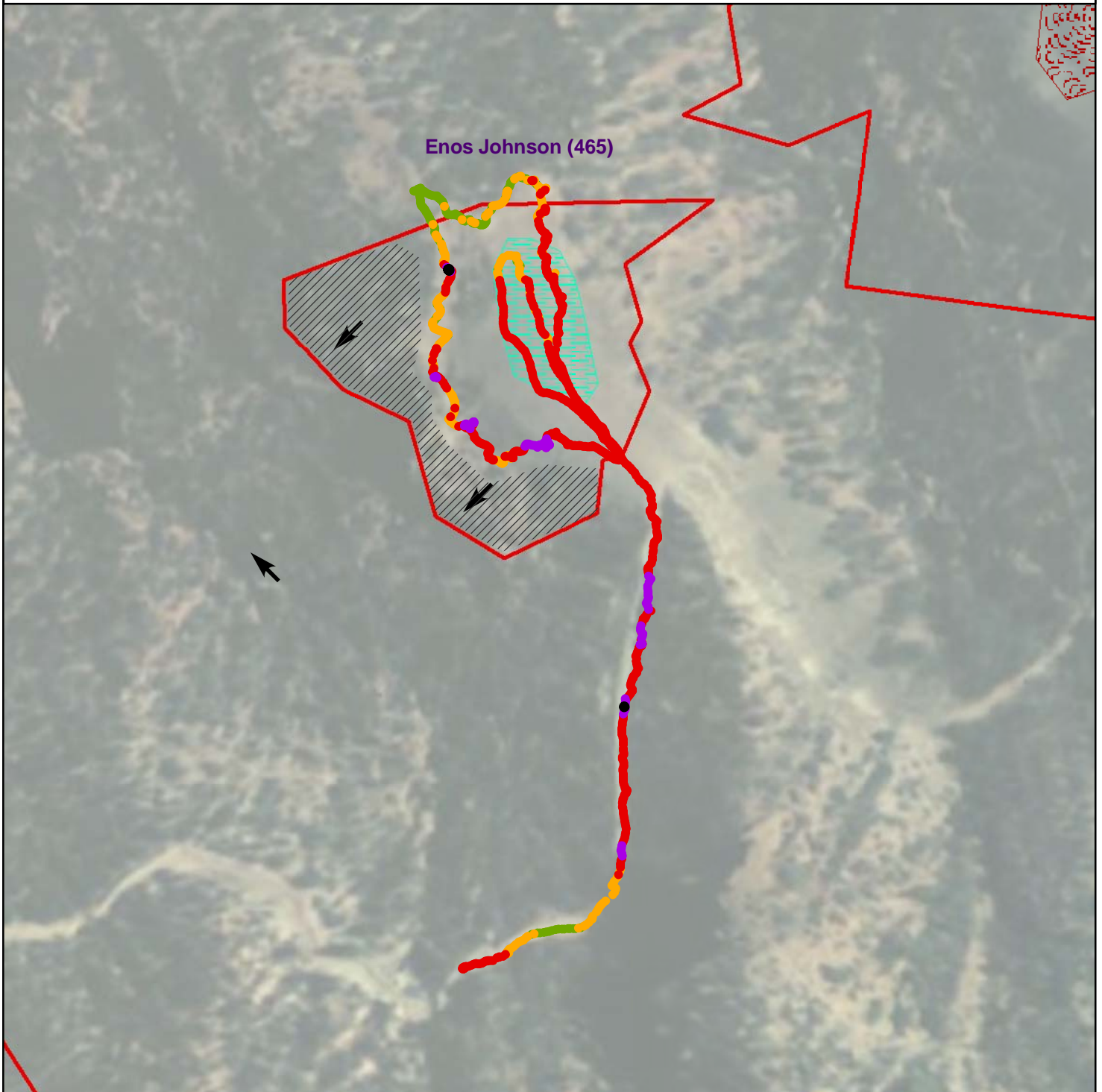
Average background = 22,989 cpm

-  Observed Reclamation Cap
-  Inaccessible due to steep grades
-  General Direction Down-Slope
-  Mine Claim Boundaries





**Figure 5 - Gamma Radiation Measurements  
Enos Johnson (465)  
Sanostee Chapter, Navajo Nation, Arizona**



## Legend

### Gamma Radiation Measurements

- 0 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 50,000
- 50,000 - 100,000
- > 100,000



Observed Reclamation Cap



Inaccessible due to steep grades



General Direction Down-Slope



Mine Claim Boundaries

Gamma survey conducted 10/2009  
Measured as counts per minute (cpm)

Average background = 22,989 cpm

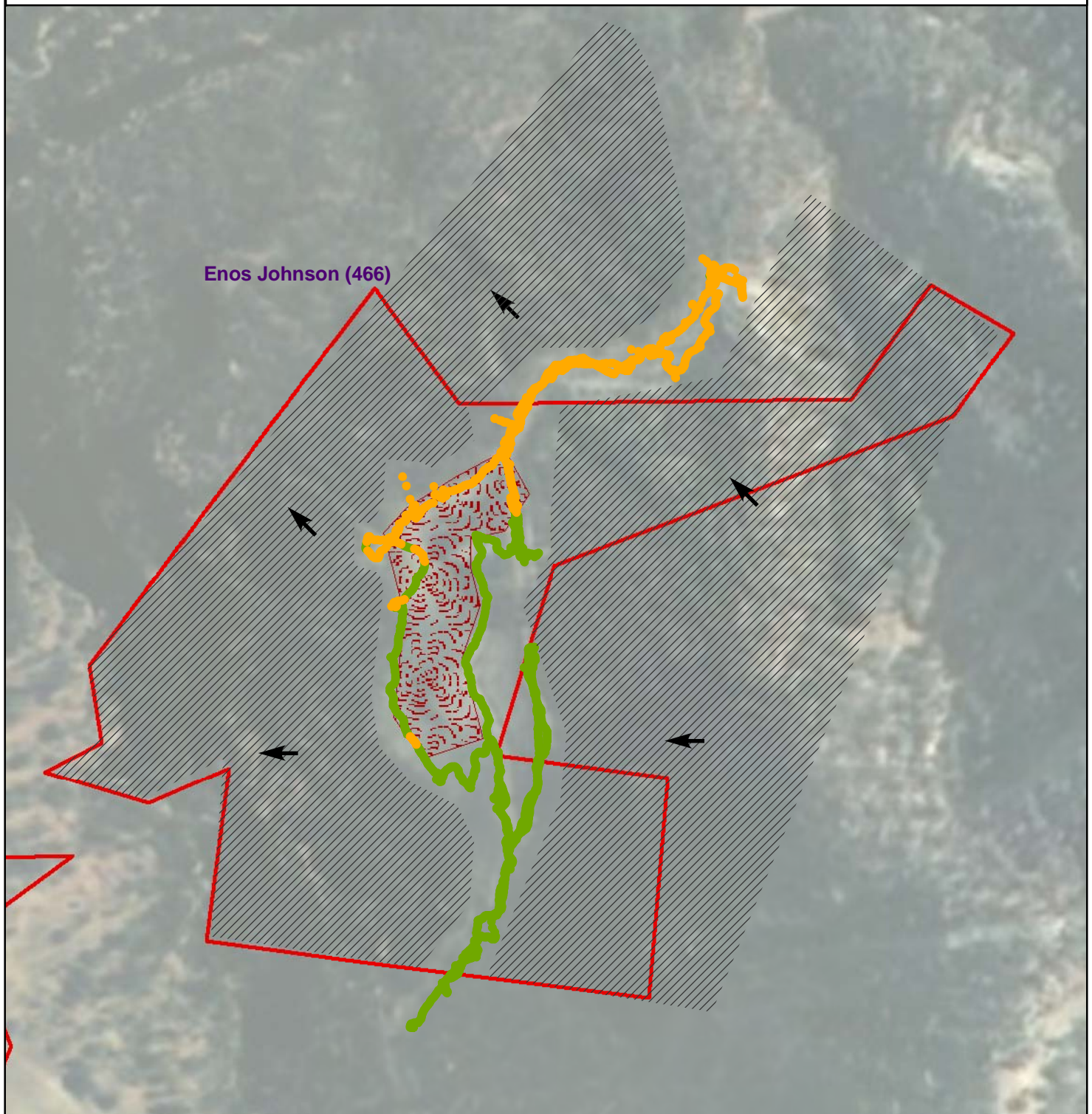


0 200 Feet



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**Figure 6 - Gamma Radiation Measurements, Above Two Times Background  
Enos Johnson (466)  
Sanostee Chapter, Navajo Nation, Arizona**







### Legend

#### Gamma Radiation Measurements


- < 2X Background
- > 2X Background

Gamma survey conducted 10/2009  
Measured as counts per minute (cpm)

Average background = 12,900 cpm

-  Observed Waste Pile
-  Inaccessible due to steep grades
-  General Direction Down-Slope
-  Mine Claim Boundaries



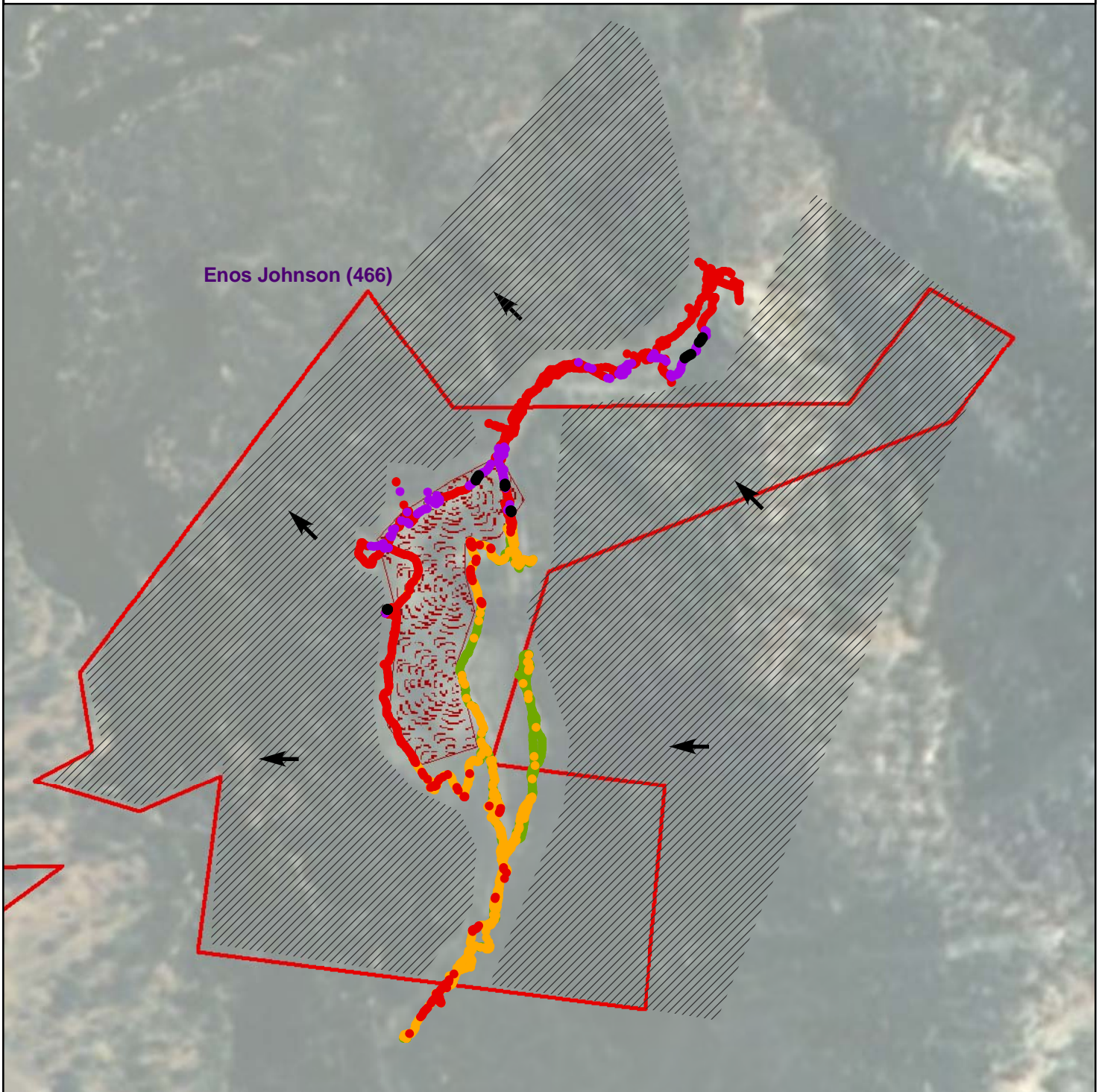
0  200 Feet



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**Figure 7 - Gamma Radiation Measurements**  
**Enos Johnson (466)**  
**Sanostee Chapter, Navajo Nation, Arizona**



## Legend

### Gamma Radiation Measurements

- 0 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 50,000
- 50,000 - 100,000
- > 100,000



**Observed Waste Pile**



**Inaccessible due to steep grades**



**General Direction Down-Slope**



**Mine Claim Boundaries**

**Gamma survey conducted 10/2009**  
**Measured as counts per minute (cpm)**

**Average background = 12,900 cpm**



0 200 Feet



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**Figure 8 - Gamma Radiation Measurements, Above Two Times Background**  
**Enos Johnson (614)**  
**Sanostee Chapter, Navajo Nation, Arizona**






## Legend

### Gamma Radiation Measurements

- < 2X Background
- > 2X Background

Gamma survey conducted 10/2009  
 Measured as counts per minute (cpm)

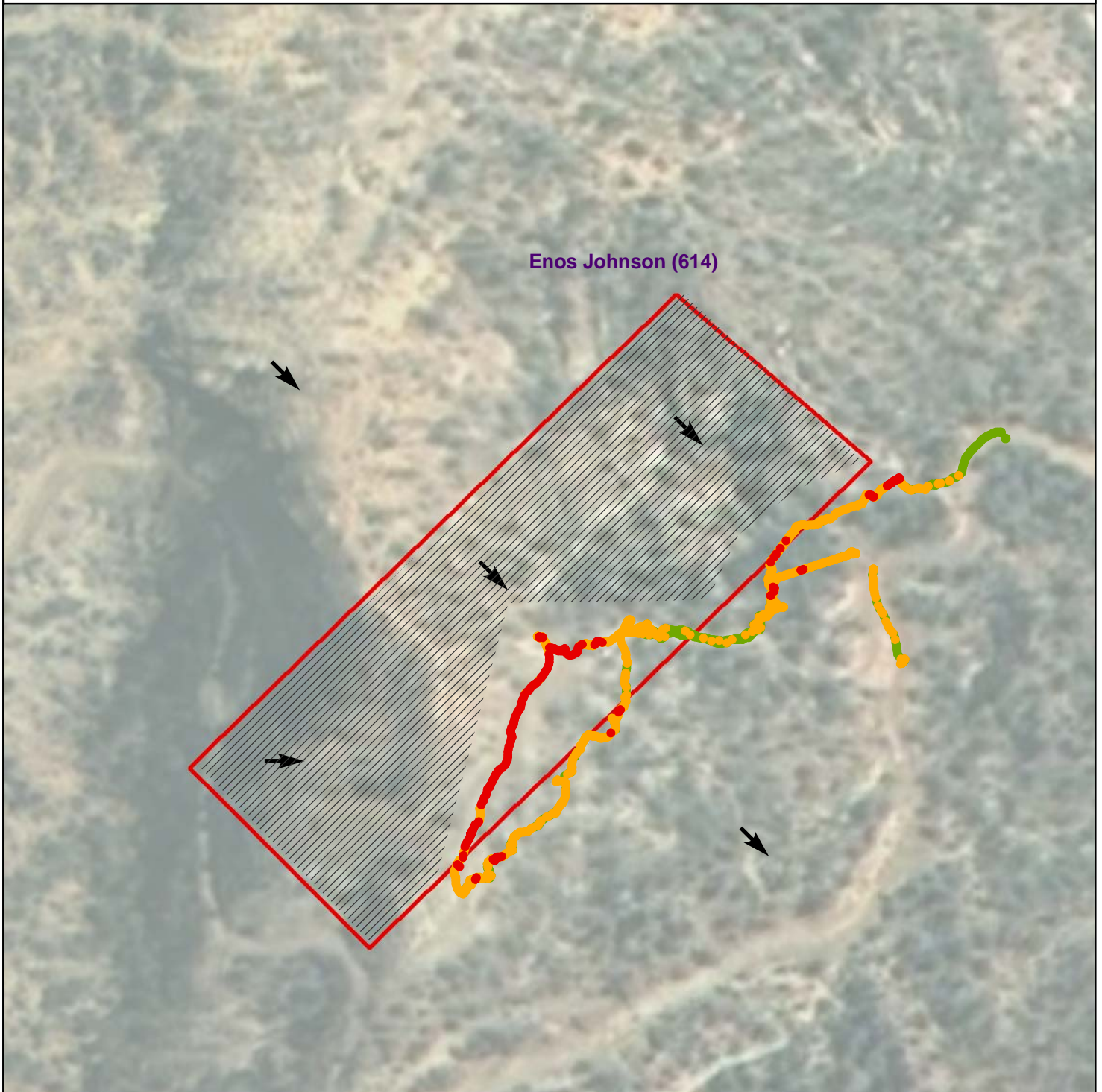
Average background = 13,252 cpm

-  Inaccessible due to steep grades
-  General Direction Down-Slope
-  Mine Claim Boundaries





**Figure 9 - Gamma Radiation Measurements**  
**Enos Johnson (614)**  
**Sanostee Chapter, Navajo Nation, Arizona**



## Legend

### Gamma Radiation Measurements

- 0 - 10,000
- 10,000 - 15,000
- 15,000 - 20,000
- 20,000 - 50,000
- 50,000 - 100,000
- > 100,000

 Inaccessible due to steep grades


 General Direction Down-Slope

 Mine Claim Boundaries

Gamma survey conducted 10/2009  
 Measured as counts per minute (cpm)

Average background = 13,252 cpm



 Feet  
 0 200



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